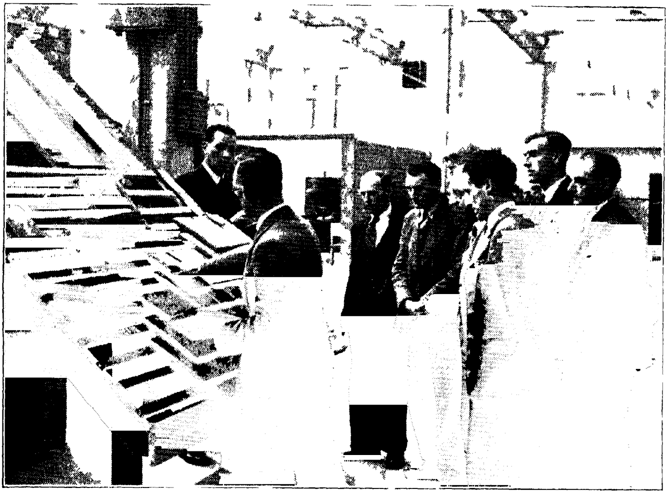
TEACHING FOR TRADES





Photos by A. W. Kerr

DEMONSTRATION AND PRACTICE

TEACHING FOR TRADES

A GUIDE TO THE TRAINING OF WORKERS IN MANUAL TRADES

BY

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With a Foreword by

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LONDON

SIR ISAAC PITMAN & SONS, LTD.

First Published 1948

SIR ISAAC PITMAN & SONS, LTD.
PITMAN HOUSE, PARKER STREET, KINGSWAY, LONDON, W.C.2.
THE PITMAN PRESS, BATH
PITMAN HOUSE, LITTLE COLLINS STREET, MELBOURNE
27 BECKETTS BUILDINGS, PRESIDENT STREET, JOHANNESBURG

ASSOCIATED COMPANIES
PITMAN PUBLISHING CORPORATION
2 WEST 45TH STREET, NEW YORK
205 WEST MONROE STREET, CHICAGO

SIR ISAAC PITMAN & SONS (CANADA), LTD.
(INCORPORATING THE COMMERCIAL TEXT BOOK COMPANY)
PITMAN HOUSE, 381-383 CHURCH STREET, TORONTO

BOOK PRODUCTION WAR ECONOMY STANDARD

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MADE IN GREAT BRITAIN BY WILLMER BROS. & CO. LTD., BIRKENHEAD
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FOREWORD

There is no doubt that, if the great expansion of vocational training in industrial, technical, and Government establishments is to give the greatest return, the training of teachers for this work is of first importance.

My experience in the Ministry of Labour and National Service (Training Department) confirms this view, and it was necessary to provide for this aspect of training to enable the programme for the war period to be met.

I am, therefore, glad to find that this book sets forth, in a simple way, the elements of good teaching for craftsmen whose job it is to pass on their knowledge to others. This has been done without any incursions into the more remote aspects of teaching technique, and well-tried methods have been condensed to form a reliable guide to the various sections of the vocational teacher's task. Lectures, trade lessons, and demonstration methods have all been dealt with in a way that should immediately appeal to the practical man, and firms setting up their own training schemes will find the chapters on staffing and equipment helpful.

The author has had ample opportunity of testing the efficacy of the methods described and seeing the results in practice, and although the field is such a large one and could have been treated much more extensively, this manual has rightly, in my opinion, been confined to fundamentals, and as such I commend it to the attention of all concerned with the great problems of post-war training.

PREFACE

The author has for long felt that the problems arising in craft teaching have not been given as much attention as the importance of the work merits. The literature available dealing with this branch of teaching is scanty and this book has been written in the hope that it may increase the knowledge of the subject.

Most of the matter is concerned with the application of fundamental principles. It is hoped that the planned application of these principles may be of assistance both to the actual instructor and to others responsible for staff training in all its forms.

An attempt has been made to deal with the subject on broad lines and not to specialize on any single trade or group of trades or vocations. Further, and in view of the fact that it is intended to assist any competent craftsman to improve his teaching ability, the finer points of teaching technique, especially those concerned with the psychological approach, have not been considered as strictly relevant to a book of this type.

The author is indebted to his colleague C. H. Turner, Esq., for reading the manuscript, to E. Watson-Smyth, C.B.E., M.I.Mech.E., F.I.I.A., for his encouraging foreword, and to his publishers for much assistance and forbearance in the preparation and printing of this volume.

A.W.H.

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CHAPTER I

SCOPE AND SELECTION

As the aim of what is to follow in this book is to offer guidance on the selection and training of teachers of vocational and craft subjects, it would seem desirable at the outset to define the term " Vocational Training " so far as it affects the principles and methods examined later in the text.

Vocational Training

It could rightly be argued that any training that has for its immediate purpose the fitting of a person to carry out a given job is vocational; especially so if the job is to be a means of livelihood. This definition would, therefore, embrace all forms of professional as well as craft training. Nevertheless, there are points of difference. Although many of the principles examined in this book are fundamental and apply to most forms of teaching, it is intended to limit the extent of their application here to the training of staff who, in their turn, will be required to pass on to others a knowledge of, and skill in, their own jobs, particularly jobs where manipulative ability is called into play. Where a job does not involve manipulative ability, some of the examples and methods laid down will not be quite appropriate. But it can be said that the fundamental principles of inculcating a knowledge of a given job into the mind of a beginner are applicable to most occupations, whether or not they involve manual operations. It is hoped that this point will emerge more clearly later on, and at this stage it is not thought necessary to examine the matter in detail, but merely to repeat that the concern of the writer is mainly with trades and occupations involving some degree of manual skill. In the later chapters, advice will be offered on utilizing these trades teachers for works training schemes.

There is at the present time a widespread demand for trained workers, and this demand is likely to be maintained in an increasing degree for some considerable time. It is only necessary to mention the building trades in general for this point to become apparent. If this skilled personnel is to be obtained in the large numbers required, it is obvious that a far different approach will have to be used than that which has obtained in the past, and it is already appreciated by many industrialists that training on a very large scale will be necessary.

If this training is to be successful, the obvious first requirement is for a body of skilled teachers with qualifications not only in their own trade or occupation, but with a good basic knowledge of teaching methods; methods embracing not only the spoken and written word, but practical demonstration and example. It is with this task this book is concerned, and unless it is tackled energetically the larger one of providing numbers of skilled workers as quickly as possible is not likely to be satisfactorily solved.

Much has already been done in Technical Schools and Colleges to meet the demand for trained workers. Instruction has been carried out on both a full and a part time basis, but it is probable that a considerable proportion of the students attending such courses do so mainly from the point of view of qualifying for higher posts in their own particular occupations, rather than from the point of view of improving their standard of skill or productivity in their existing grade of job. Whilst this is a worthy ambition, and one not to be discouraged, it still leaves the much larger problem of training in a trade or craft as an end in itself somewhat unsatisfied.

The Government has recognized the national importance of the task ahead and has tackled the problem vigorously, with, in many cases, remarkable results. During the war the need was particularly urgent, and training for the munition and subsidiary industries was carried out on a very large scale.

Progressive firms, encouraged by Government backing and assistance, have also set up training schemes to meet their own particular requirements.

The Services have, owing to modern mechanization, had the same problems to overcome, and they in their turn have found it necessary to adopt measures for training on an increasingly wide scale.

In every case the selection and training of instructors has assumed prime importance, as it is upon this factor that the success or otherwise of any scheme of training ultimately depends.

Problems in Training the Teacher

Some of the difficulties encountered in training teachers of vocational subjects seem, at the outset, to be almost insurmountable, particularly when the occupations or crafts involved are of such a nature that the standard of the worker himself, from an educational point of view, need not necessarily be very high. All teaching at some point calls for explicit oral instruction, and in some crafts this is very seldom brought into play. A vocational instructor could not conduct a course of instruction without at some time or other being called upon to prepare accurate oral or written work. It need hardly be mentioned that these are qualities that seldom need to be exercised by some craftsmen. Yet it is expert craftsmen that are needed to train beginners.

The statement above is not intended to belittle in any way any particular craft, or the followers of the craft. It is merely stating a fact. If this point is kept in mind, it can readily be seen that special considerations and special methods may need to be adopted, if some forms of vocational training are to be successful.

It is not always fully appreciated that a first class craftsman is not necessarily a first class teacher of his craft, although it is a necessity (and this point will be examined in more detail later on) that a vocational teacher should be a competent worker in his own trade.

Nevertheless, a combination of expert craftsman and expert teacher is a very rare one, and one of the problems to be overcome in providing teaching staff for vocational training is the development of the teaching craft as distinct from the vocational craft.

Another problem that arises is the maintenance of a balance between the purely manipulative and demonstration teaching methods, and the oral or written work. Naturally, the average worker is more at ease if he is demonstrating some particular aspect of his craft rather than talking about it; but it is suggested that this in itself is not enough, and that such practical demonstrations must, during some period at least of the training, be supported and elaborated by oral or written instruction.

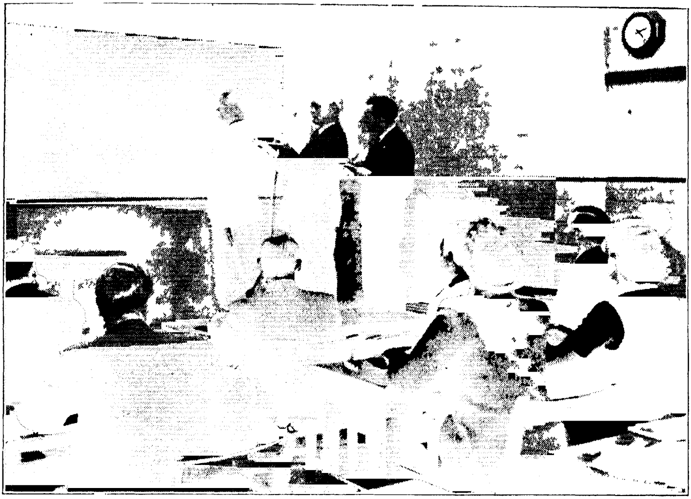
This book offers guidance on methods to overcome these problems. It should, however, be recognized at this stage that many related problems will arise because of the particular difficulties connected with a particular job or occupation.

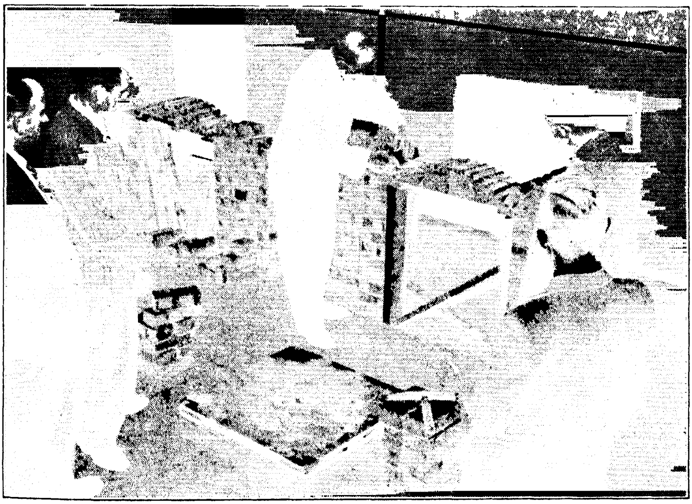
It would be impossible in a book of this nature to give the answers to all the possible combinations of circumstances that may arise. It is hoped, therefore, that the broad principles and methods laid down, will at least provide clues to the solution of special difficulties.

Selection of Staff

It is well to remember that the instructor, teacher, trainer, or whatever term may be applied, is in a key position in relation to his trainees, and that not only must he be carefully selected from a trade standpoint in the first place, but he must subsequently be trained in, and encouraged to use and appreciate, all the teaching methods open to him.

It would be unwise to encourage him to use these means according to his own personal preference; for if training is to be effective, the instruction given must be correlated to a set plan. The trade under consideration will to some extent influence the use of certain methods, but the underlying





Photos by A W Kerr

DEMONSTRATIONS FOR TAILORING AND BUILDING

principles of teaching a vocational subject are fundamental, and as such become the tools of the teacher.

In the selection of a man to be trained as a vocational teacher it must obviously be a prime requirement that he be skilled in his own particular occupation or craft. But it is not quite so obvious, although just as necessary, that he should have practised this under trade conditions. The more varied these conditions, the better in general will his trade background be, assuming that the experience he has had has been connected with good class work, and not under circumstances where the emphasis has been on quantity rather than quality. This insistence on good industrial experience is an important one from the point of view of the men ultimately to be trained. If the trainee is to take his place successfully in the industrial field, his training must also be carried out under industrial conditions and by teachers who have an industrial background.

Much so-called vocational training has in the past been carried out by those whose acquaintance with the particular craft has been obtained, very sketchily in some cases, by attendance at courses with no industrial background. Whilst this may be adequate for purely " hand and eye " training, it cannot be considered an ideal means of fitting a man to earn a living under industrial conditions. It is suggested, therefore, that where the particular vocation calls for an apprenticeship, the teacher should have had that recognized training. Evidence of attendance at technical courses during the period he has been practising his craft is also desirable, not only from the point of view of the knowledge he may have gained, but as an indication of interest and ambition.

Certificates or diplomas gained as a result of such studies may, of course, be valuable guides as to attainment but their suitability or worth from an instructing angle are matters which only a technical assessor can estimate.

In the preliminary selection of personnel for instructional purposes it is, therefore, important that, assuming a selection or interviewing panel is the means used, one of the members of

the panel should be a technical man fully acquainted with the trades to be considered. His knowledge of the particular industry will be valuable in deciding how much importance should be placed on particulars of experience, the calibre of the firms worked for, and the quality of the work in which the applicant has been engaged.

Firms setting up their own training schemes may, naturally, wish to appoint members of their existing staff as teachers. The selection is then less difficult, because a much more detailed record and knowledge of character and personality is available. Unless the trade or business is of a very specialized character, it may be found to be advisable to bring in suitably qualified candidates and train them in teaching rather than rely on existing staff.

Trade or industrial qualifications are not the only qualities necessary. There must be evidence of an enthusiasm for the particular job, and a wide interest in all aspects of the trade concerned. For instance, if a potential teacher for carpentry is under consideration, a knowledge of such matters as the distribution of the timber-growing areas of the world, the qualities and categories of various types of timber, methods of working timber in other countries, and an intelligent interest in related crafts, such as cabinet making, are all evidence of wide interests, and a desire to keep abreast with developments in related fields.

Again, it is often found that whilst a candidate may have many of the qualities noted above, he may, nevertheless, have certain inhibitions when required to impart his knowledge to others. Unfortunately, in some men an attitude still persists that to share their knowledge, particularly of a craft, with others is in the long run detrimental, not only to themselves personally but to the craft in general. An attitude such as this should disqualify any applicant for the post of a teacher for trades. Although the candidate may satisfy the interviewers that his training has been right, that his subsequent experience has been wide, and that he has no diffidence about

imparting his knowledge to others, it is still necessary to ascertain whether he has the requisite type of approach to, and sympathy with, the efforts of a beginner, to make his teaching effective.

If the training to be given is to younger people, some evidence of a contact with and an interest in young people's problems and an ability to approach matters at their level is essential. Membership and work in connexion with youth organizations is often an indication as to whether this attribute is present.

A high standard of general personality should be expected. The task of training the teacher will be considerably eased if certain qualities are present, although training and practice may be necessary to develop these qualities further. A pleasant appearance, a good speaking voice, a confident manner, but one free from any trace of arrogance, are some of the desirable qualities that can be assessed at an interview, and that will form a good basis for further training. If in addition there is evidence of a logical habit of thought, a capability to express thoughts clearly and convincingly and with a well controlled sense of humour, the task of training will be lightened still further.

Qualities Required

To obtain in one and the same person all the qualities referred to above is very seldom possible. Assuming that it is possible to recruit experienced men with some theoretical background, and an enthusiasm for their particular jobs, and who in addition feel they would like to teach, how can existing qualities be further developed, and, if necessary, new qualities inculcated ?

We will deal with the trade experience angle first. The degree of experience required in the prospective teacher, will, to some extent, depend upon the degree of proficiency which his trainees are expected to attain. It will be recognized that the teaching of an absolute beginner requires a more

expert approach from a teaching point of view than the training of an advanced student.

If the candidate exhibits many of the qualities mentioned above, which are not strictly technical qualifications but indicate teaching potentiality, it would be unwise to insist on too high a standard on the technical side, provided the syllabus to be covered is not intended to take his trainees to a very high standard. The ideal, of course, is to get the teaching potentiality equal to the craft knowledge; but as this ideal is seldom encountered it is better for the teaching potentiality to be the greater, even if this means some lowering of the craft standard.

At all times a teacher should be a living example to his students. This implies the possession of personal characteristics and standards that must be largely already inherent and acquired. Students tend to take their standard of behaviour and performance from their teacher, and a man who is sensible of this responsibility will take every care to see that he sets a sufficiently high standard of example.

Enthusiasm for his craft is especially important in a vocational teacher. An attitude which tends to emphasize the pecuniary advantages of a particular job, as against its "worth-whileness," is one to be deprecated. Similarly, an attitude suggesting that the teacher is only teaching because it is his livelihood, and not because he feels that he is assisting in an important national task, is one that tends to lower the ultimate results of his efforts. A teacher has wide responsibilities, and the handling of his students may make or mar their careers. He must understand the learning difficulties of the class, and be fair and impartial in his dealings with them. An ability to put himself in the place of the beginner, with a sympathetic attitude towards the slow thinkers, is imperative. Not only must he be a leader, but in some cases also a follower, and he must at all times be sympathetic to the ideas, attitudes and problems of the students being taught.

No man can expect to be an efficient teacher unless he is able to develop a co-operative atmosphere in his class, and to build up a cheerful and considerate attitude between himself and his students. They will reflect his good qualities, and unfortunately his bad ones too, and he must ever be on his guard against saying or doing anything that will be likely to influence wrongly his students. If he expects to obtain loyalty, enthusiasm, and hard work from his class, he in his turn must be prepared to give to his own job a similar measure of loyalty, enthusiasm, and hard work.

One of the biggest problems involved in instructing a class, particularly of beginners, is to get them to think constructively. The teacher, therefore, must himself be able to think clearly and logically, and to do this not only in the quiet of his own room, but also when he is in the class room or at the bench. To think clearly, to write and speak so that his ideas are imparted clearly and logically to his students, to be able to give explanations in such a way that a student can grasp and is satisfied with these explanations, to answer even the most elementary question in a conscientious and satisfying way, are all matters that a good teacher needs to be able to take in his stride. He must beware of the danger of imparting wrong principles or information, and be able to appreciate that what may be an elementary and easily understood matter to himself may be a key problem in the mind of the student; unless such a key problem is fully dealt with, it may set up a lasting obstacle, with drastic results to subsequent instruction.

The reader may have come to the conclusion at this stage that it is impossible to find all these qualities in one person, and this is probably right. However, it can be said very definitely that, given some of the qualities, the teacher can develop others, and it will be the purpose of what follows to attempt to give guidance on how qualifications referred to above can be inculcated, or, where necessary, amplified and improved.

CHAPTER II

PERSONAL QUALITIES

In a scheme for training teachers careful thought must be given to methods whereby the necessary and desirable qualities may be developed in the would-be teacher, and this is perhaps of particular importance in the training of vocational teachers.

Improving Inherent Qualities

Trade Qualifications. It is not possible in a short course of teacher-training to include improvement in trade qualifications. In the previous chapter it has been said that these qualifications are necessary, and that evidence of having practised his trade or occupation under industrial conditions is also a necessity. Admittedly in the process of teaching others he will improve his manual dexterity, but this is more incidental than otherwise, and may be safely left to take care of itself. It is a well-known fact that only when one attempts to show another how something is accomplished, do some deficiencies become apparent, and the ambitious teacher will neglect no opportunity of gaining further practice, even if only of a refresher nature, in his own particular craft.

Confidence. The essential point that emerges, when it is stated that a teacher should have a confident approach to his teaching problems, is that he should *appear* confident. There are very few individuals who have complete control and confidence when addressing a group of people, and training is required to eliminate nervousness and thus enhance the value of the instruction given. Confidence is founded upon knowledge. If there is limited knowledge, confidence easily becomes bluff. Bluff is very readily detected by a class; once it *is* detected, the prestige of the teacher immediately falls, and

although it may have been a momentary lapse a great deal of effort is required to restore the position.

The knowledge behind a confident personality is not only a knowledge of the subject-matter of the instruction, but a knowledge that this subject-matter has been carefully prepared beforehand, and training in this preparation is an essential factor in promoting the necessary confidence so essential to good instruction. More will be said at a later stage on preparation, which in some ways is the key to a successful and confident approach.

Again, a knowledge that the class is in tune with the teacher is extremely valuable in building up a confident bearing. To be successful, a teacher must do everything possible to promote co-operation between himself and his students, and his own approach and personality then become more effective. Many points, which may appear minor, influence a confident bearing. Such matters as the knowledge that everything has been done to provide all the necessary appliances or aids to the lesson; the fact that emergencies are provided for by ensuring that a demonstration or experiment works; that the blackboard is well lighted and at the correct height, and that the right coloured chalk will be available when required—all these are factors in building up a confident and easy approach to the lecture or demonstration.

An ability to talk to the class as a whole, and not be distracted by an individual in the class, is one to be cultivated.

Some men are blessed by nature with a confident expression, an alert bearing, and a pleasing friendly approach. In others these have to be developed.

Personal Discipline. As stated above, students will tend to model their thoughts and actions on those of their teacher. An impatient teacher will breed impatience in his class. One who relies on a sarcastic reply to a difficult question will either effectively stop the class from asking questions or will, in his turn, receive sarcastic and irrelevant answers.

Unpunctuality at both the beginning and the end of classes will inevitably lead to slackness on the part of the class. Similarly, an untidy appearance, or carelessness exhibited in the work on the blackboard or in the presentation of a demonstration, will discourage good habits in the student.

Distracting mannerisms should be avoided. It is not always possible to recognize mannerisms in oneself, and the services of a candid friend should be sought in this connexion. Anything that detracts from the complete concentration of the student on the matter being taught must be eliminated.

Juggling with chalk, swinging a pointer, pacing the platform, continual sorting of notes, straightening a tie, are all examples of distracting mannerisms that, if indulged in repeatedly throughout a teaching session, distract and sometimes embarrass the class. A student who is waiting for the teacher to upset the inkwell he is fiddling with is not giving his whole attention to the subject being taught.

Approach. The class will quickly detect an unenthusiastic approach to the subject. There must be no suggestion at any time that the importance of the matter being presented is not fully recognized by the teacher, and it will never be possible to raise enthusiasm in the class unless the teacher also exhibits the same enthusiasm in imparting his knowledge.

It is not sufficient for the teacher to present his knowledge to the class with a " take it or leave it " attitude. Rather should he suggest, by both the terms he uses and his manner of presentation, that the instruction being given is important, that he personally believes in it and practises it, and that he has no shadow of doubt as to its usefulness and ultimate benefit to each student.

Speaking. Clear, deliberate enunciation, addressed impersonally to the whole of the class, is important. A slower pace than that used in average conversation, particular attention to word endings, and a readiness to explain or write up on the blackboard any new term or unusual word used, are necessary at all times.

The volume of sound and speed of speaking should be varied occasionally, so as to avoid an uninteresting monotone. Full use should be made of pauses. To pause before a statement, or even a word, often adds emphasis. A pause after an important point has been made, whilst the teacher is observing the reaction of the class, gives the listeners time to fix that point in their memory. Avoid long and involved sentences; the simple sentence is invariably the most effective.

The voice is a valuable instrument capable of great exploitation. Its effectiveness in teaching is in direct proportion to its quality or tone and the variations of speed and volume used. Clarity without forcing the volume should be the aim.

Initiative. Students are immediately impressed by the qualities of initiative displayed by their teacher. An apparently awkward situation quickly and smoothly overcome gives the class confidence in their teacher. An ability to grasp a new approach presented by a question, and to use it as a means of demonstrating some particular aspect of the subject being taught, is a valuable attribute, and can be acquired only by constant practice and a wide range of interests. Clear and constructive thinking is the basis of such an ability.

Instructing Ability. An ability to pass on knowledge to another depends upon an understanding of how other people learn, an appreciation of the most effective instructional methods for a given subject, and the appropriate attitude in presenting the instruction.

A teacher must know his class individually and from this knowledge arrive at an assessment of the standard of instruction that the majority can absorb. This standard will be maintained for the greater part of the time available, but at certain times the laggards will be given special attention or the forward students additional work.

Whilst it is comparatively simple to specify the above mentioned qualities and to give the reasons why they are necessary, it is not so easy to define methods whereby they can be acquired, or even improved.

To take the first, confidence may be inherent in some degree, and it is only by the acquisition of knowledge, and the exercise and expounding of that knowledge in public, that the requisite full confidence is eventually gained.

Self-discipline is also a personal matter. Attention in dealing with small and apparently unimportant things will rapidly become a habit by practice; once the habit is acquired, it is almost unconsciously developed until it becomes a second nature.

A person who is a " good mixer " will have no difficulty in setting up a friendly and approachable atmosphere in his class work, and therefore it should be the object of all teachers to take every opportunity of mixing with other people, discussing topics of the day, or even raising topics, if by so doing a new line of approach can be obtained to the difficulties of others. The art of listening intelligently matters here, as also does the ability and courage to express a point of view even if that point of view is not necessarily held by the majority of the group.

It is not intended to suggest that the argumentative or discursive type of person is the best teacher. Far from it. Patience and tolerance for the other man's point of view, and the ability to lead and suggest are more important qualifications than an ability for hard-hitting debate. Incidentally, practice in debating leads to an improvement in speech and initiative. Good speaking is built up on clear enunciation, a good vocabulary, and an ability to choose the right word for the right occasion. It is obvious that initiative comes in here also. In fact, a good approach, using the right word in a clear voice, plus the necessary ability to pick up a line of thought, are all interrelated matters, and part of teaching ability.

Why Training is Necessary

The preceding paragraphs have given a general indication of the qualities required in a successful teacher. Where these qualities are purely personal, some suggestions have been

given as to what form of personal activity will develop the qualities to the best advantage.

It is now necessary to particularize, and to indicate in what way a training scheme for teachers can both develop inherent qualities and, where necessary, inculcate others.

Unfortunately, it is very seldom that an individual recognizes all his own faults. Any training must, during some part of it at least, concentrate on candid criticism in order that the individual, whether he likes it or otherwise, shall be made aware of his faults and failings. To do this, not only is correction needed at almost every stage, but the corrections must be followed by examples of " how to do it." It is never sufficient to point out that a certain thing must not be done, or even to point out how not to do it. The correct approach must always be the positive one, namely, " This is the way it can be done with purpose and advantage."

Personal characteristics are best improved by helpful criticism, comment, and practice in the correct manner. This practice is more effective if it is carried out on a planned basis, and if the corrections are consistent. In other words the teacher as well as the student must be required to work to a plan.

One method of approaching the problem would be to take each separate characteristic and concentrate on the correction of that one only, and follow with similar treatment for each characteristic in turn. This method is likely to become a great strain on the teacher and very monotonous and uninteresting to the student. For instance, speech being one of the important points, the training could be split up in such a way that speech and speech alone could be dealt with as quite a distinct subject. Such matters as breathing exercises and elocution lessons could be advocated as a means of improving this one qualification. It is, however, more effective, and introduces considerably less strain on all concerned, if this factor is considered and worked upon in conjunction with some, at least, of the others.

Therefore, in the plan that will be proposed here each section of the *teaching work* necessary in a training scheme will be separately dealt with, and each would-be teacher given opportunities of doing this section of the work. It may be a lecture, a trade lesson, or simply a practical demonstration; after each, the teacher in charge will comment on all the points involved, whether they concern speech, gesture, logical sequence, or any other aspect of that particular sample of work. This form of training is necessary in order that a uniform standard of progress may be possible, and also in order that the individual student may profit, not only by commentaries directed to himself, but also by those directed to others in the same class. Not only is this likely to save time, but the individual gets his correction in a more easily assimilated way.

It will be found that telling a person he is wrong often creates less effect than if he is allowed to recognize in the correction offered to some one else his own faults and failings. This is an essential part of training, and, once the idea is grasped by the class, far more satisfactory results accrue than if individuals are allowed either to correct themselves or to listen to corrections on all points intended for themselves only.

Results to be Expected

If this training plan is carried out consistently, results are obtained in a shorter time, and with less effort.

No form of training for teaching is ever really complete. Further practice must inevitably improve results up to a given point. At this point refresher courses for teachers become necessary, and that is a separate subject for consideration. The stage reached will depend to a certain extent on the time devoted to the training, and there is much to be said for an intensive course as against a long drawn out period when the danger of staleness may arise.

It should be possible, given reasonable staffing arrangements, to cover the basic principles of vocational teaching,

and to give a reasonable amount of practice and time for correction within a period of 4 weeks. This, of course, assumes full-time working of, say, 30 to 35 hours per week. At the end of that time the average tradesman can be expected to have developed a sufficient style, and competency in preparing and presenting his subject matter, to enable him to take a class. It is not suggested that he will be a first class teacher; that will come only with continual practice, and a repeated checking of his own efforts. Nevertheless, experience has shown that even in the short space of a fortnight, under proper training conditions, a very great improvement is shown as between the first effort at teaching and subsequent attempts. This theme will be developed in the next chapter, where an outline of the complete plan will be given.

CHAPTER III

PLANNING THE CURRICULUM

The main aim of a teachers' training course is obviously to develop teaching ability. This development will be assisted if the student already has the correct mental attitude. Having once adopted this attitude, the ability to teach will be developed by practice according to plan, and by a constant check-up on the results. The approach must be based on a willingness to get down to the level of the beginner, appreciate his difficulties and problems, and grasp any opportunity that may arise for understanding the needs of the person being taught.

Teaching requires a methodical mind, anxious and determined to pre-plan the lesson and to deliver it tidily and clearly: tidiness means that there shall be no loose ends of information, or unexplained phrases that may confuse the student. It also requires a patient mind, always capable of understanding a beginner's difficulties. New information or methods must be readily adapted to the teacher's particular purpose. A determination to develop these qualities and apply them to a set plan will go far to overcome even the major difficulties of effective teaching.

Planning

The above attributes will be useless unless they are used in conjunction with a set plan, and although the plan may be influenced by the particular trade involved, it is essential that *some* plan be adopted from the start. Modifications may be necessary in the light of experience, but it is patent that, if it is necessary for the teacher to cultivate methodical thinking processes, a good deal of the value of these processes will be lost unless they are applied through a methodically planned programme. Nothing is more distracting to the learner than

to have information put over to him in unconnected bits and pieces. Some sequence is essential, otherwise the learner's mind is being constantly switched from one aspect of a job to another, to the detriment of his grasp of the subject as a whole.

Therefore, in arranging a teacher's training course consideration must be given to the separate sections into which the training falls, and a programme drawn up that will keep these sections in their natural order while, at the same time, introducing just sufficient variety to keep the interest of the class active.

Periods for informal discussion can be arranged at intervals throughout the course. If a visit to an industrial establishment connected with the craft side of the teacher's work can be arranged, it will form a useful and refreshing change in the curriculum.

Some time must be allowed for the students' own preparation, and periods so allotted should be regarded as being entirely at their disposal with no set work given. If the sequence of subjects being taught is correct and the preparation periods are carefully distributed, it will be found that students will need to use these periods to the best advantage if they are to keep abreast of the time-table. This has been allowed for in the suggested time-table given on pages 20 and 21. It will be noted that these periods occur, either at the end of a succession of lectures, thus allowing notes to be written up, or interspersed with practice work, so that material may be prepared.

Influence of the Trade

Some trades and occupations will call for a greater insistence on one method than another. Almost all manual occupations demand a good deal of practical work as part of the training of the teacher. In other cases where the emphasis is not so much on the practical side, it may be advisable to make more of the written or oral work. The avowed object of any form of

TEACHERS'

The table is given as an example of the arrangement of subject-
the percentage of the total time devoted to each subject would

	9.0—10 a.m.	10.15—11.15 a.m.	11.30 a.m.—12.30 p.m.
(1)	Introductory.	General Lecture.	Lecture Technique.
(2)	Lecture Technique.	Lecture Technique (Model Lesson).	Theory Lesson.
(3)	General Lecture.	Trade Lesson Practice.	Trade Lesson Practice.
(4)	Theory Lesson.	General Lecture.	Trade Lesson Practice.
(5)	General (Discussion).	Trade Lesson Practice.	General Lecture.
(6)	Practical Demonstrations.	Trade Lesson Practice.	Practical Demonstrations.
(7)	General Lecture.	Trade Lesson Practice.	Practical Demonstrations.
(8)	General (Discussion).	Trade Lesson Practice.	Trade Lesson Practice.
(9)	Theory Lesson.	Trade Lesson Practice.	Practical Demonstrations.
(10)	Theory Lesson.	Trade Lesson Practice.	Theory Lesson.

TRAINING PLAN

matter covering a period of ten days. In a course of any length remain approximately the same.

1.30—2.30 p.m.	2.45—3.45 p.m.	4.0—5 p.m.
Preparation.	Lecture Technique (Model Lecture).	Theory Lesson.
Preparation.	Lecture Technique (Blackboard Work).	General (Discussion).
Preparation.	Demonstration Technique.	Demonstration Technique (Model Demonstration).
Preparation.	Trade Lesson Practice.	Demonstration Technique.
Preparation.	Theory Lesson.	Practical Demonstrations.
Practical Demonstrations.	Theory Lesson.	Lecture Technique (Revision).
Preparation.	Trade Lesson Practice.	Theory Lesson.
Preparation.	Practical Demonstrations.	General Lecture.
Preparation.	General Lecture.	Practical Demonstrations.
Preparation.	Practical Demonstrations.	General.

training should be to give proficiency in the particular job under consideration, and only by considering how much the success of the particular job depends on practical efficiency, and how much on theoretical, can the necessary balance be decided.

Earlier in this book it has been said that it was intended to cover mainly training for trades, and the outline plan is given as a typical example of planning for this type of training.

Outline Plan

It will be assumed that the trade for which teachers are required is that of carpentry and joinery. The basis of the curriculum should be as follows—

General Lectures	20 per cent.
Trade Lessons	20 ,, ,,
Practical Demonstrations	15 ,, ,,
Theoretical Lessons	15 ,, ,,
Lecturing Technique	10 ,, ,,
Demonstration Technique	5 ,, ,,
Preparation Periods	15 ,, ,,

The general lectures would cover such matters as: the importance of the teacher; his relations with his class; personality requirements; and background talks on the trade and its connexion with other trades.

The trade lesson will be an important section of the teacher's work and he must be given instruction in the preparation and presentation of these lessons, and an opportunity of practising their delivery. They will normally be of a shorter duration than the general lectures, and will cover materials used, tools involved, craft methods, and all subjects that have a bearing on trade practice and craft customs.

The practical demonstrations will consist of recognized methods employed in the craft, with emphasis on economy of time and materials, and the avoidance of undue fatigue Craft methods should be stressed, but an important object is

to lay down a definite technique in order that the learner may assimilate the best methods of approaching a given practical operation. The stage by stage technique for demonstrations will be elaborated in a succeeding chapter.

Careful consideration should be given as to how far the theoretical side of any craft needs to be developed. This is dependent to some extent on the standard that the students will be expected to reach. As the emphasis, so far as this book is concerned, is on craft training, no more theory should be given than is necessary to keep pace with the practical knowledge. Instruction and practice in simple calculations involving weights, areas, and capacity are necessary, and if the particular trade calls for proficiency in constructional methods where stresses and strains are an important factor, some acquaintance with this side of the work would obviously be required.

It must, however, be borne in mind that the average craftsman is presented with his drawings and quantities, and it is not until he reaches the position of a charge-hand or foreman that he is required to work out quantities or calculate safe loads.

Part-time courses at Technical Colleges cater for these additional theory requirements and it is better not to insist on too high a requirement in a training course that is purely for the craft teacher. The people he will eventually train should be encouraged to continue their studies at Technical Institutes, and the teacher should be reminded that he should consider it as part of his duty to give this encouragement. The teacher with knowledge of the trade will be invaluable when he is advising on suitable courses of study for his trainees.

Instruction in the technique of lecturing is best done by the teacher's giving lectures to the class. Such subjects as the arrangement of notes, the preparation of subject matter, guidance on blackboard illustration, and hints on correcting speech errors will be included. The sub-division of the lecture into sections and the methods of dealing with questions are

also important but again this will be more fully dealt with in a succeeding chapter.

The object of demonstration technique is to accustom the teacher to visualize, prepare, and present a complete demonstration in a convincing and logical manner. Most of the time will be taken up by the students' giving practice demonstrations and the teacher correcting and commenting on the ability shown.

Methods

It will be apparent from the foregoing that the methods in any plan for training teachers fall into three main groups. These may be labelled the "telling method," the "showing method," and the "doing method." No one of these is complete in itself, and almost all forms of teaching use more than one of these methods. Some subjects demand an emphasis on one and some on another, and it is from a balanced arrangement of these methods that successful teaching arises (see Chapters IV to VII).

Organization and Staff

The organization necessary to apply these methods should be such as will comfortably deal with the expected flow of students and it is important that no attempt should be made to work too many hours per day. Effective teaching demands a good deal of strenuous mental effort, and this cannot be maintained at the necessary level if unduly long hours are expected. A six-hour day, suitably broken up by meal breaks and intervals between sessions with occasional free periods for preparation and informal discussions, is the maximum that can be expected if good results are to be obtained.

The whole object should be to create an atmosphere of studious endeavour, free from any urge to produce stereotyped results with a minimum expenditure of time and effort.

Staff conditions and equipment should be of the best; to deal adequately with a class of sixteen teachers in training, two staff teachers in addition to a Superintendent of Training are required. This introduces variety in the approach and the programme given on pages 20-21 can be covered effectively.

Staff, buildings, and equipment are considered in relation to the workers' training plan in Chapter VIII, and as the same considerations apply almost identically to a trade teachers' training plan, the reader is referred to that chapter.

CHAPTER IV

TEACHING METHODS

The methods with which we are concerned in vocational training may be roughly divided, as we have said, into exposition by the teacher, demonstration, and class practice.

TELLING

Oral instruction or " telling " can be done in a number of ways. Each way has its own particular advantages, and the subject-matter, the number of students in the class, and the type of student under instruction will determine which system is the most appropriate.

The formal lecture is perhaps the best known. Lecturing is most effective when it is applied to groups of, say, 30 or over. It should never occupy a period of more than one hour; and the students should be expected to record the substance of the lecture.

A " Lesson," which is another form of the " telling " method, differs from a lecture in so far that it may be interrupted by questions and answers, and also by exercises worked by the students themselves. A lesson might be of shorter duration than a lecture (say 30 minutes), but the essential difference between the lesson and the lecture is that the teacher is testing the comprehension of his students continually throughout the lesson period.

Individual oral instruction and, not unimportantly, the discussion group are also included in the " Telling " method. The value of discussion groups lies in the fact that students are teaching themselves, and the teacher is required only to keep the discussion in the proper channels and to give the necessary lead as occasion demands.

Showing

In this section, teaching mainly consists of practical demonstrations, but it includes also handling and manipulating actual examples of production work, either in model form or full size. Teaching the particular use of a tool or device obviously demands the " showing " method. Films, either sound or silent, may be included under this category, but they are no substitute for demonstration of actual practical work in front of the class. Pictorial diagrams, charts, working models, scale models, and analogous experiments, all play their part in a smaller or larger degree, depending on the subject being taught.

Doing and Checking

In spite of the importance and usefulness of the two methods referred to above, they are no real substitute for the actual job. If a man is to be taught, say, boot mending, there is nothing that will help him more than being given an opportunity of mending a boot, providing his efforts are guided and checked at every stage.

In effect then, the trades teacher should tell his trainee as concisely and practically as possible how to do the job, then demonstrate to him the correct method, afterwards giving him an opportunity of doing the job himself. Whilst he is doing it the teacher must be at hand to check his operations until he is satisfied that the man knows the correct methods. The final test will then be for the trainee to do the job completely on his own, asking for advice should it become necessary. Until he is able to do this, and to present a completed job that will measure up to a given standard, the teaching cannot be said to be really effective.

CHAPTER V

ORAL INSTRUCTION

It is proposed in this chapter to examine in detail the various methods of oral instruction, or what has been referred to previously as the " telling " method.

LECTURES

Probably the lecture is the best-known example of this method, and it is undoubtedly an effective form of teaching a group where the subject-matter lends itself to lecture treatment. To be effective no lecture period should last more than an hour, and at least ten minutes of that hour should be devoted to questions from the class.

The greatest value will be extracted from the lecture only if the class members are given some instruction in note taking. Opinions vary as to whether students should be encouraged to take notes indiscriminately or whether the important aspects of the subject under treatment should be given in the form of dictated notes. Both methods can be practised; but if a record of the subject-matter of the lecture is to be written up by the students immediately after the lecture, it is probable that freedom to take notes in their own way produces better results. If this is not possible, and some time must elapse between the lecture and the time when the student writes up the subject-matter, probably some form of short dictated notes is better. Particularly is this so if later the student is required to produce a lecture note-book for the purpose of reference.

In planning a one-hour lecture, the teacher should divide his subject into not more than four main sections, each dealing with some specific part of the subject, and each complete in itself. Some teachers prefer to take questions appertaining to the section immediately after it, others to take a period

at the end covering the whole of the instruction given. There is little to choose between the two methods, the essential point being that question time should be included.

It is important that full use be made of the blackboard, even if the subject does not call for explanatory diagrams when, of course, the use of the blackboard is imperative. The main and subsidiary headings of the lecture should be written on the blackboard. Any difficult words or phrases, particularly any technical expressions or trade names, should always be clearly written in order that students may copy them correctly.

If it is necessary to use prepared charts or diagrams, these should *not* be exhibited until the correct point is reached in the lecture. Blackboard diagrams should be built up as the talk proceeds and not prepared on the blackboard previously. Otherwise there is a tendency to distract, and for more attention to be devoted to the drawings and charts than to the lecturer.

The same position arises if models or examples are used to illustrate a point. These should not be displayed on the lecturer's table beforehand, but produced as required, avoiding any suggestion of a conjuring trick.

The lecturer should at all times face his class, and should avoid talking about his subject when sketching or writing on the blackboard. A good method is a little blackboard work, a little talk, more blackboard work, and further talk, so building up the sketch or diagram as the explanation proceeds.

A suggested time plan for a one-hour lecture is as follows:—

Introduction	5 minutes.
Four sections of 10 minutes each ..	40 minutes.
Questions	10 minutes.
Summary and Conclusion	5 minutes.

Owing to the time involved being rather longer than that of a lesson or demonstration period, the avoidance of mannerisms is still more important. Very often a lecture is remembered because of some gesture or attitude adopted by the lecturer, but if these gestures or peculiarities are too often

repeated they become tricks and tend to distract. If the students realize—and they quickly will do so—that a certain teacher likes tossing his chalk from one hand to the other at frequent intervals, the tendency will be for them to speculate on when he is going to do it next rather than to concentrate on what the lecturer is saying.

Personality in lecturing is particularly important, and it is not intended to suggest that a good teacher must necessarily present a stiff and lifeless appearance to his class and concern himself merely with the speaking of so many words in a certain order. If this were the case, a gramophone or sound record would be just as effective as a living lecturer. This, of course, is not so, and there is no substitute for the human voice properly controlled and backed by a compelling personality.

Therefore, if a lecturer's forcefulness, character, and personality are such that they are an aid to his teaching, he should use these to the utmost, without allowing such attributes to become a distraction to the class, and thereby detract from the teaching he is giving.

Group Instruction

As previously stated, numbers for lesson or group instruction should be smaller than for the more formal lecture. In dealing with an instruction or lesson group, the form of the subject-matter should be more concise, and more attention can then be paid to individual points of difficulty.

The "Trade Lesson" should rarely take more than 30 minutes, and a successful time division is :—

Introduction	2 minutes.
Instruction (possibly in two 10 minute periods)	20 minutes.
Questions	5 minutes.
Summary	3 minutes.

The use of teaching aids such as models, actual jobs, diagrams, and experiments fits more successfully into a trade

lesson than into a lecture. The subject-matter is more closely defined, and aids can be more pertinent and create a much more vivid impression on the students than if the same object is attempted when the subject-matter has a wider range.

As the training of teachers in this method is under consideration, opportunities should be given for each member of the group to prepare and present a lesson of this description. Therefore, if the time required to train a given group is to be kept within reasonable bounds, the number in a group should be kept low, and it is suggested that not more than 16, but not less than 12, is a suitable range.

The method adopted should be first for instruction to be given to the group on the preparation and presentation of the subject. Then the teacher in charge of the group should give a model lesson emphasizing points on preparation, presentation, and timing, after which each member of the group in turn will give a lesson on a subject relative to his trade. This subject should preferably be selected in consultation with his teacher. After each attempt the teacher will comment constructively on the work done, not only to improve the student's ability, but in order that the rest of the class may note both the good points and bad points of the lesson that has been given.

At no time should an attempt be made to lay down hard and fast rules unless good reasons can be given. It is not sufficient to say that a thing should be done in a certain way unless the teacher is prepared to say why it is necessary to do it in that way.

It has been found in practice that after a class of 16 people have heard each member of that class give a lesson of this description, each on a different aspect of the same trade, their ability to prepare and present such a lesson has improved very considerably. The fact that the students are all under the same conditions and are trying to combat the same difficulties breeds a spirit of co-operation and fellow feeling that rapidly produces the required results. If the teacher can associate

The teacher puts a question to the whole class. After a pause he calls on a student by name for the answer. This ensures that all the class are exercising their minds, not knowing who will be called upon next. If the answer is not correct or only partially so, the teacher will perhaps frame the question a little differently or use some suggestive lead and ask another student. Having obtained the necessary answer, the teacher will record this information on the blackboard, either in words, by building up a diagram, or as appropriate to the form of instruction being given, and from it he can frame the next question. In this way the whole subject is built up.

To illustrate what has been said above, a simple example of this technique follows :—

ELECTRICAL CIRCUIT

TEACHER: We are about to consider a subject involving electrical circuits, and it is necessary to understand what is meant by a circuit, and also, how these operate electrically.

QUESTION: What do you understand, when a person states he has made a circuit of a building ? You, Jones.

ANSWER: He has passed round it.

QUESTION: Yes—now how could he pass round, say, the outside of a house ? Robinson.

ANSWER: By walking.

QUESTION: Right—and if he had to do this easily and quickly, what would be necessary ? Brown.

ANSWER: A road or track of some sort.

QUESTION: Quite—now combining those two items of information, what do we get ? Clarke.

ANSWER: To make a circuit means travelling completely round, and an easy path is necessary to do it quickly.

QUESTION: Just so. Now, applying that principle, you could tell us what an electric circuit *might* be ? Parker.

ANSWER: Electricity travelling round and round by an easy path.

QUESTION: Good—and you know enough about electricity, surely, to say what the path usually consists of ? Spinks.

ANSWER: I should say wires.

TEACHER: Well, you have between you decided that an electrical circuit involves the passing of electricity from a point and return to that point by means of wires. That is so. Now remember that, and we will pass on to the means by which the electricity is provided.

The above is given as a very simple example of the technique described, and would, of course, apply only to a very elemen-

tary class. In a teacher's training course such examples are used to illustrate the method to be employed in trades teaching and not for improving the technical knowledge of the teacher in training, which has been already assessed as satisfactory.

By adapting the method to the standard of the students, and avoiding the too "leading" type of question, a high standard of class activity can be maintained.

Questions are most commonly used to test the students' powers of observation and assimilation : in other words, a form of examination. If this is carried out orally in class, the method previously referred to of calling upon any class member *after* the question has been put should be used.

In some respects, particularly from the point of view of promoting class activity, this form of question is better than a written one. When a recorded result is required, written questions and individually written answers are necessary, but in dealing with this general subject of question technique, the oral method is assumed.

Sometimes the skilful use of questions is of great assistance in correcting errors, as distinct from detecting errors. It will be found that failings are more strongly impressed upon an individual if those failings are corrected by pertinent questions. Whilst the discovery of errors has some value, the correcting of those errors is more effective in producing results.

Questions can vary considerably, and some skill and experience is necessary before a teacher can frame a question to produce a given result. In general, the standard of brightness of the students will vary, and in using the oral question technique, the aim should be to frame the question to suit the standard of intelligence, so that the backward student may be encouraged and the brighter student given an opportunity of sharing his knowledge with the rest of the class. Incidentally, although showmanship must be curbed, information so imparted by one of the students does act as an incentive to the rest of the class.

Discussion Groups

Teaching under this heading is more informal, but has certain advantages, particularly with some types of students. In using this method the students are not previously aware of the subject to be discussed, but, of course, the teacher is, and will have prepared as carefully as for any other teaching session. If the group is to function freely as a discussion group, the teacher must not *appear* to have formed any pre-arranged plan; in fact, the art of conducting a discussion group lies mainly in creating a feeling of spontaneity. The teacher should adopt a friendly and informal manner, and use one of several methods to start the discussion: it may be by referring to a paragraph in a trade journal or, possibly, some incident that has occurred during the course of other forms of training. Having introduced this topic for discussion, the teacher's aim then is to keep the discussion on the right lines and to encourage every one to take part. All the time careful watch should be kept to see that the inattentive student is urged, and the shy student encouraged.

The value of this method falls very sharply if the discussion gets out of hand and develops into a series of personal arguments. Another danger sometimes arises from the tendency for the discussion to go off at a tangent, and although this diversion may be more interesting to the class, it may not have any instructional value.

At all times the teacher must guard against forcing his own opinions on the class. He must, as occasion demands, guide, lead, restrain where necessary, but allow the information he requires to come from the class members, and not from himself. So far as vocational teaching is concerned, this method is of most use on background subjects, and matters where, say, a trade custom may vary from man to man, or from district to district. An open forum of this description will often produce a majority opinion as to which is the most suitable method, if methods are in dispute. One result may be that the form of instruction being given by the teacher becomes

more acceptable by certain members of the class, and, incidentally, the teacher himself gains knowledge and further confidence in his teaching work.

The teacher should give full value to the results of such discussions, even when they do not coincide with some of his own ideas, and he may have to adapt his teaching methods to correct certain impressions that have been revealed, or to bring them more into line with his students' capabilities.

CHAPTER VI

DEMONSTRATION

" Telling," as a teaching method, is not complete in itself, and must in vocational training be combined with " showing."

" Showing " Methods

These can take many forms, and involve far more than " showing " in the sense of exhibiting. The display of completed work or models of completed work, with the necessary drawings, is a part of the " showing " method, but this must be linked up with what may be called " manipulative showing " : this is more commonly termed a practical demonstration. Showing connotes visual observation on the part of the student: therefore, the first essential of any instruction depending on visual observation must be that it is performed or given under conditions where the student can see clearly and completely the instruction being offered.

This is not only a matter of sufficient illumination. A class room, demonstration room, work bench, or working area may be well lighted, either naturally or artificially, but if the students are in a position unsuitable for observing what the teacher is doing or what he is showing, the value of the instruction is very definitely lowered. It therefore follows that any teaching involving practical work, whether it be a demonstration of an actual job or the working of a machine, involves problems of both illumination *and* position. As far as possible, where manipulative skill is being demonstrated, the student should see the operation from the same angle as the operator. Hence, practical demonstrations are best given individually. Although the rest of the class may be present as observers, they will not normally see the operations being carried out from the same standpoint as they would if they were doing the job.

Any plan of training involving manual dexterity must allow sufficient time to ensure that each member of the class has an opportunity of seeing the practical work being done from the correct angle, and also of doing the job himself.

Many factors are involved in teaching by demonstration, and the following paragraphs deal with the practical demonstration as one method of vocational training.

Practical Demonstration

The foregoing will, it is hoped, have convinced the reader that telling is not enough, and that practical demonstrations will support the " telling " by " *showing* " the learner precisely how the job should be done. These demonstrations should be carried out as far as possible under the same conditions and with the same tools and appliances as would be usual in industry.

The demonstration should not be too long or involved, and it should be complete in itself. It is necessary to break down a lengthy job so as to separate it into component parts, each as complete as is possible, and capable of being planned and taught as a separate section, even if this means adding to the total number of demonstrations.

When the plan given later is examined, it will be seen that, if the subject-matter of the demonstration covers too wide a range, the method becomes involved and the knowledge retained by the student correspondingly reduced. For most crafts, operations and processes can, by careful analysis on the part of the teacher, be split up into 5 to 10 minute demonstrations. If these demonstrations are of a progressive nature, and each one arranged to include some of the skills taught in previous demonstrations, so much the better.

Some " telling " is necessary during a demonstration. Some processes require more explanatory talk than others, but careful planning and analysis can reduce the amount of speaking to a minimum, and this is to be encouraged.

The method of approach is first to make sure, by suitable questions, that the student is familiar with any previous

instruction leading up to the subject in hand. The teacher, having satisfied himself on this point, will ensure that the student is in a position from which he can observe the demonstration from the same view-point as the demonstrator. The teacher will do the job, explaining briefly, where necessary, as he proceeds. Having assured himself that the student understands, he will then ask him to carry out the job, adopting the same sequence and emphasizing the same essential points. The teacher will correct the student as he proceeds, and, if necessary, require him to repeat until a satisfactory result is achieved.

In preparing a demonstration of this nature, it is helpful to the teacher if the plan to be followed is first set out in writing. This plan is a simple matter and merely involves setting down in order and as concisely as possible the various progressive stages of the job. As each stage is reached there will be certain points that the demonstrator must note to ensure that each particular part of the job is successfully completed. In this way, the demonstration may be split up into four or five successive stages, and for each stage reminders may be necessary to ensure the success of that stage. Once the plan has been laid down it should be adhered to, and the student, in carrying out the job for the teacher's consideration, should be required to keep to the same sequence. An example of this simple plan follows—

REPLACING A WINDOW PANE

	STAGE	POINTS TO WATCH
1	Check glass.	Size, squareness. Safe handling.
2	Apply putty bed to frame.	Putty soft. Evenly spread.
3	Place glass in position.	Firmly. Continuous contact with putty bed.
4	Brad and point with putty.	Care with hammer. Clear opening. Clean edges. Clean glass.

The checking and follow-up of these demonstrations will be dealt with in a later chapter.

Other Demonstrations

Teaching by showing is not merely confined to demonstrations of manipulative skill. As previously mentioned, other means can be used that are included in the " showing " group. For instance, completed jobs can be used to show both good and bad points of any particular craft. These are often the best type of demonstration objects. Models of such jobs, while they cannot be avoided in some instances because of size or inaccessibility, are not as good as actual jobs.

Charts, diagrams, and sketches, either perspective or otherwise, are all valuable in varying degrees. Unless the students are acquainted with mechanical drawing methods, dimensioned or isometric sketches are easier to understand. The teacher should acquire, by practice, the ability to make such simple sketches for use in his lessons involving blackboard illustration. The average manipulative worker apprehends as much from competent sketches as from actual " telling." If the student can be encouraged and assisted to record these sketches in a permanent form for reference purposes, the value of the training is enhanced. Not only has he a memory picture, but also an actual picture in his reference book.

Every opportunity should be taken of using drawings, charts, and samples of materials or jobs in a completed or partly completed state. Where difficulty is encountered in the students' grasping the working principles of a completed mechanism or construction, sectional models are often of great use. The same applies to drawings. A simple sectional drawing will often convey more than an elaborate external view.

Vocational training calls for the fullest use to be made of the " showing " method. The worker to be trained will eventually be dealing with real things, and the more reality that can be introduced into his training by the teacher, the easier will be its absorption, and the easier will the teacher's task become.

Films

No examination of the "showing" method would be complete without reference to films. Films may be of the greatest assistance under certain conditions and for certain processes and jobs. In others their value is doubtful. Their greatest advantage seems to be in illustrating methods as distinct from actual skills. It is obviously impossible to acquire skill by watching a film. Whilst the film may give the method of approach and, if slowed down, will perhaps reveal certain movements that would not normally be noticed, it cannot communicate to the onlooker any sense of "feel" or the "nice manipulation" of, say, a tool or machine. If films are used, they should be preceded by an explanatory talk by the teacher, describing the purpose for which the film is being shown, and giving a short synopsis of its content.

Film exhibitions should not last more than 45 minutes, (including the teacher's introduction and summary), and to obtain the best results should be followed by a period for questions and discussion. If they can be shown in a lighted room so that onlookers can take notes, so much the better. This also allows for the teacher to sense the class reaction. There is a danger, and it should be watched, that unless they are specially made for a given job under careful supervision from a teaching standpoint, films become more of an entertainment than a teaching aid.

Stage by Stage Method

Before proceeding to the next chapter, which will be concerned with the "Doing and Checking" method, it appears appropriate to enlarge a little on the stage by stage approach to practical work, mentioned earlier in this chapter.

It has been advocated that the teacher should prepare a plan of his demonstration work, define the stages, and record against each stage reminders of the points that it is necessary to watch if each stage is to be completed successfully.

There may be a tendency to allow "the tail to wag the dog," and to confuse the points that have to be watched with the required stages for the successful carrying out of the job. In brief, a stage in the performance of the work should be something that carries the job along towards completion, and the "reminders" should be points that ensure that the progress of the job is not hindered by matters that are, perhaps, a little outside the actual work but have a very real bearing on its successful completion. Not only may these "reminders" refer to the actual job in the sense of the tools and materials being used and the conditions under which the work is being carried out, but they may also apply to the person carrying out the work. For instance, it may be necessary for the teacher to remind himself that a certain operation that he is about to teach may be dangerous either to the student or other people working near by. If so, in his instruction he will make that a point: not a point that affects the progress of the job under ordinary conditions, but a "reminder" that such a danger, if it is not allowed for, may affect the worker's ability to carry out the job.

The principle involved is that no circumstance, whether it be one of order, progression, speed, convenience, position, tidiness, or the many others, should be unprovided for in giving instruction. Unless all are provided for, the instruction is not complete. As the test of completeness in instruction is whether the learner understands and can carry out the job, the teacher is obviously not teaching the job correctly if he fails to provide against these eventualities, or impress upon the learner the importance of giving his attention to such related matters.

CHAPTER VII

DOING THE JOB

The preceding chapters have dealt mainly with the methods advocated for the training of teachers of vocational subjects within the limits laid down in Chapter I. The teacher in training will ultimately be required to use the methods that he has practised in his training when he himself is qualified to train craftsmen. The lecture, lesson, demonstration, and discussion will all be used to the one end of training people to carry out a given job.

THE TRAINEE AT WORK

The final criterion of effective instruction, as we have said, will be the ability of the person taught to perform a given job. His ability to do so can be decided only by giving him the job to do and methodically checking his attempts. This is the last stage in the training process and should take place only after the teacher has satisfied himself that every point of the necessary instruction has been covered.

It is necessary, therefore, at this stage, to consider the methods to be used for checking the results of instruction, as exemplified in the job being carried out, and for this purpose the craftsman in training will be referred to as the " trainee " and his instructor as the " teacher."

The same care must be taken in the preparation of the job as was necessary during the actual teaching, and it is most important to ensure that, before a trainee starts, tools, materials, and drawings are adequate for the particular job. His work place, also, must be suitable: good lighting, space, and safe surroundings are necessary. Once both the trainee and the teacher are satisfied on these matters, the trainee should be allowed to carry on the job unaided, unless he requires assistance. Therefore, the instruction should be to

carry on with the job as taught, and in the event of any difficulty or lack of information arising, he should be told definitely where and when the teacher can be consulted.

Interim Checks

It will be necessary, at intervals, to check the job for quality and progress. These checks will not affect the final test on completion, but are intended to ensure that one stage of the work does not, through some small error, prejudice a succeeding stage. These interim checks should not be too obvious, and a careful approach is very necessary if the trainee is not to be flustered, or feel resentment at not being allowed to try out something that he is convinced he has learned properly.

The teacher should form an estimate of the time that one particular stage of the work normally takes to complete, and visit the trainee at that time—not with a stop-watch and note book in hand, but ostensibly with the intention of inquiring as to his progress. The teacher will be able to see not only what the time progress has been, but also the quality of the work produced.

Unless there is a definite quality of the work that will prejudice a succeeding stage, no criticism should be attempted at this stage.

It will be understandable that trainees' work will not necessarily be of first-rate quality, although this is to be aimed at. If the quality, however, is reasonably satisfactory, and will not detrimentally affect later operations, no action need be taken at the time.

The results of these interim checks should be recorded, as it will be seen later that these will form the basis of assessment of the completed job. The information recorded should be mainly in two categories: the first in respect of the time taken, and the second in respect of the quality. The relation between the quality obtained and the time taken is not important in the early stages, but it will be at a later stage. The aim should be first for quality, and second for speed.

The ultimate aim will be the maximum speed consistent with a high standard of quality.

Completion Checks

The data recorded during the interim checks will be useful in considering the completed job. It will be found that the trainee is anxious, immediately a piece of work has been completed, to have his teacher's opinion, and unless the teacher has collected the maximum amount of information whilst the job has been in progress, he will find it difficult to give an opinion immediately. The notes he has made during the checking at each stage, together with a survey of the completed work, should enable him to give a considered and worth-while opinion.

Whilst making the final check, it will add considerably to the interest if the teacher explains while the check is in progress what he is looking for, and why. This will give the teacher an opportunity to explain why certain things are not up to standard, and to relate those reasons to failings that were apparent in the early stages. It is very satisfying to the trainee if the teacher can say: "If a certain preliminary operation had been done in *this* way the completed job would not suffer from *this* defect."

Whilst every encouragement and praise should be given for successful work, it would not be just to the trainee unless his failings also were pointed out. If the job is one that it is proposed the trainee should do a number of times, it may be best in the first instance to concentrate on one or two major failings, and correct the minor ones in a later example.

Very often, however, it will be found that the trainee, in correcting the major points, and having had the method advocated by the teacher reiterated, will recognize and correct his minor failings without having them called to his attention. This, of course, is a very desirable position to attain, and the method advocated gives the trainee every opportunity of displaying this initiative.

Undue criticism, either in quantity or emphasis, destroys initiative, and the aim should be to assess the trainee's reaction to criticism and give only as much as he can take without discouragement. At no time should faults be pointed out for which the remedy cannot be given.

Unless for very special reasons, blame or praise should not be given in the presence of other trainees. The exception to this rule is when commentary on a certain aspect of the job, be it a good one or one not so good, is likely to help the rest of the class. It is important, however, that when this is done the object of doing it is made plain before any commentary takes place.

In order that the standard aimed at shall be uniform, it is a great advantage to have a completed example of the particular job to which reference can be made. Again it must be stressed that this example should not be of an unduly high standard: otherwise the trainee is discouraged early in his learning process, with detrimental effect to his later work.

The Operation as a Whole

Having checked at various stages and then on completion, the trainee should be encouraged to view and understand the whole job as a completed piece of work—not only in the sense of the particular job itself, but also from the point of view of its relation to other jobs. For instance, if the example being considered is a window frame, not only is it necessary to consider the completed job as a separate window frame, but also to consider it from the point of view of its incorporation in a building. Much added interest will accrue if the trainee understands how this particular window is fixed and how it compares with other types, so far as usefulness and suitability are concerned, for certain types of building. Many of the qualities required in a window frame are predetermined by its ultimate use. The type of ventilation aimed at, for instance, will determine to some extent how the sash opens, whether it is to be a sliding, casement, or hopper type. All these considerations may affect the construction in some

measure, and certainly give the trainee a better picture of the completed job. Any circumstance that adds to his interest—and this background information *will* add to his interest—should be introduced and developed as much as possible.

Repetition

It may be necessary for the trainee to repeat the exercise a number of times before the necessary standard of proficiency is reached. Extreme care is essential. Repetition of the same exercise may lead to boredom and a sense of frustration. To prevent this, a good deal of thought and analysis is necessary on the part of the teacher. He must cultivate the ability to determine, at a very early stage, which particular part of the operation or job is causing the necessity to repeat, and it may be that early in the first example such a point can be corrected instead of waiting until the completion check. This may save repetition. Nevertheless, it is not always possible to single out the part of the operation where the break-down has occurred, and it may be that the trouble is just an unsatisfactory general standard. If this is so, only repetition can cure the trouble, but repetition without pointing out to the trainee what he is to correct would be useless. Each successive repeat should cure at least one aspect of the general standard.

Incidentally, this repetition will generally improve speed, although that is not its main object. If, in correcting points of quality, speed is improved, so much the better, but generally speaking the speed element will be developed unconsciously, whereas the quality element requires a good deal of conscious effort.

Great importance is attached to this section of the learning process. Only by "doing" under proper conditions, with the teacher to comment and advise, can the learning be satisfactorily completed. Only by having told, shown, and allowed the learner to do the job with constant check and repetition where necessary, will the teacher have covered all the elements of good teaching.

CHAPTER VIII

ORGANIZATION OF TRAINING SCHEMES

In view of the fact that many industrial firms have special requirements for their own undertakings, and that many will be organizing training schemes for their own workers, it is thought that a book of this description should include some guidance on the setting up of such schemes. This and succeeding chapters will therefore deal with the training of workers, utilizing the trade teachers whose training has already been considered.

Requirements

It should be said at the start that each particular trade or business will inevitably require its own particular methods and organization, but many fundamental requirements will be present in all cases. There is no need to stress the desirability of firms undertaking their own training. Only the directors of the firm can decide the extent of the training, and the sections of their business to which it is applicable. When this has been decided, the following outline should be of assistance in setting up the organization and indicating the lines upon which the curriculum should be based.

Background Instruction

Whatever may be said later regarding actual subjects for the curriculum, there is one general consideration that will be common to any form of training. This is that training for a section of the work should not be isolated from the general background of the firm's activities. If training is to be satisfactorily carried out and taken up enthusiastically by the worker, it is important that he should be given some idea of how his particular job fits into the general scheme of the firm's activities. If, for instance, it is proposed to train

upholsterers for a furniture-making firm, this training will be far more effective if the people concerned have a general knowledge of the organization and methods employed in making the goods to which their upholstery is being applied.

During the war years great increases in production arose simply from the fact that the workers concerned were told by means of lectures, films, and actual examples, how their product fitted into the general scheme of warfare. Girls making parts of aircraft made these parts with far greater interest and gave increased output when they knew at which point in an aeroplane's construction their own job came in; what part it played in the working and handling of the machine; what happened if that particular part failed; why it was necessary for some parts to be extremely accurate, and why others need not be so accurate. This is only one example of the value of background instruction.

In industries whose products are used in perhaps a number of different countries, considerable interest will be evinced by the worker as to the kind of people who will use the articles he is making. Another aspect of this background instruction concerns the materials being used, their manufacture, their cost and the processes necessary before the finished state is reached.

Organization and Staff

Before exact guidance can be given on the form any organization for training should take, the first consideration must be the numbers to be trained and how large the class unit can be made. Previous chapters have indicated that each separate section of teaching work has an ideal class number, but it is generally impossible to obtain the ideal conditions, and if safe methods are to be adopted, a compromise is usually arrived at that will meet most of the conditions required.

Assuming that methods previously described are to be adopted, 14 to 18 is a reasonable number for class work.

The number of staff required for the teaching will again depend on the number of such classes under instruction at any given time. Larger firms will probably be able to foresee a continual flow of workers to their training organization and will plan their arrangements accordingly. Others may not have such large numbers, and they must decide either on a smaller number per class, which generally is no detriment, or a definite period for the training scheme to continue.

Assuming the 16 unit is adopted, and the training needs to be completed in a reasonable time, it is advantageous to have two teachers allocated to this class unit. Not only does this ensure that each section of the work is properly covered, but it further introduces a certain amount of variety in the methods of approach that adds to the trainee's interest and, ultimately, leads to better results. It also has the advantage of preserving the continuity of the class training in the event of unavoidable absence of one of the teachers.

The whole organization for training should be the sole responsibility of one person. His status within the firm should be such as to give him direct access to the principals without necessarily passing through departmental heads. If a departmental head, for any reason, is given control of training, it may lead to difficulties with other departmental managers. The training scheme should be considered as important a department of the firm's activities as any of the trading departments, and its chief should carry the same status and responsibility.

Much of the success of any scheme of this description will depend, firstly, on the calibre of the man in charge, secondly, on the status that he occupies in the firm, and, thirdly, on the support given to him by the principals. He should be selected with very great care. While it is necessary that he has a knowledge of and interest in the firm's activities, it is also most important that he be a man of wide general interests, possessing a good deal of vision, imagination, and enthusiasm, and an aptitude for interesting and conveying his enthusiasm

to others. Particularly is this necessary if the people in training are adolescents.

While training would be his primary job, some advantage arises if his duties and responsibilities include a certain amount of welfare work, but he should be no substitute for a welfare officer, and should not be looked upon as a general assistant to the welfare officer. His interests in the welfare side, if any, should be strictly defined, and normally it is appropriate that only the educational and cultural side of welfare activities, as distinct from the social side, should be his particular concern.

Staff working under the superintendent of training should also be selected with very great care. This has been mentioned earlier, but it is necessary to stress that the superintendent should have a very large share in this selection. If he considers a candidate unsuitable, it would be wise to give full effect to this opinion. Training is such a personal matter, and staff relationships, as well as the relationships between teacher and trainee, play a very important part. It would be unreasonable to expect the good team work and happy personal relations that are so necessary, unless the superintendent had a large measure of freedom in selection as well as complete control of his staff.

Any system of loaning staff for teaching purposes from other departments for short periods is unsatisfactory and, however small the scheme, it is important that the teachers be trained full-time officers, so as to build up a close personal contact with their colleagues and the workers under training.

Any special subject-matter that may form a minor part of the course, such as special lectures on particular processes or organization within the firm, can be dealt with by visiting lecturers, but the general scheme of training is essentially a matter for continuous and close contact, and therefore involves full-time service.

Staff Conditions

The staff concerned should be given a good deal of latitude in their approach to the work, and so long as the plan laid

down is covered, methods of individual approach may vary considerably. Any suggestion that trained workers can be produced in the same mechanical way as the manufactured goods are turned out cannot but produce unfortunate results. Training, particularly the form of training that is under review, cannot be forced. Interest, understanding, and co-operation are the underlying principles that should guide the activities of the teacher.

For the above reasons the conditions under which the staff work, from the point of view of both surroundings and amenities generally, should be of the best. This does not imply that unduly elaborate or imposing surroundings are necessary. Adequacy and fitness for purpose are the main considerations. Unless both staff and trainees are comfortable, and free from disturbing influences, such as badly heated rooms, bad lighting conditions, or unduly meticulous supervision, teaching and learning cannot proceed satisfactorily.

Buildings and Equipment

Certain aspects of what has been noted above apply very forcibly to the actual buildings and equipment. It is necessary for the superintendent to have a private room for maintaining his records and interviewing trainees. The staff working under him should share a general room, this being desirable in order that the closest co-operation can be maintained in their activities. The staff room will not only be one for conducting business, but will be the scene of informal conferences and discussions, and should therefore be suitably equipped with furniture that allows relaxation as necessary. At the same time furniture for writing, storing books, papers, and periodicals should be available. The adequacy of lighting, heating, and ventilation is common to all parts of the building used for training, and should receive special attention.

Rooms in which classes will be held should be provided with writing tables and comfortable chairs for the trainees, and a

small platform with table, chair, and reading desk for the teacher, and the teaching aids provided should be as generous as the scheme will allow. A well-lighted and large-sized blackboard is indispensable, and a projection lantern or epidiascope is very desirable.

The lecture rooms will vary in size and number, depending on the size of class and the extent of the scheme. Space should be provided in front of the class for carrying out individual demonstrations. This will enable the demonstration plan described earlier to be carried out in the same room. When the teacher has given his lesson, he may want to supplement this by an actual demonstration or experiment, and without moving to some other part of the building, he can carry out the work in the same room and immediately following his talk.

In addition to the lecture rooms or class rooms, space is required for practical work. As this will involve working on actual examples of the products of the firm, the aim should be to allocate a generous separate floor area, in order that as much actuality as possible may be introduced into the training.

To illustrate this point, assume that the manufacture of, say, motor car bodies is the concern of the undertaking. For training purposes it would be necessary to have samples of car bodies on which the trainees could work, and these would require considerable space. This practical training should not, however, take place in the manufacturing workshops. Samples of the work should be set up in the special training workshop in order that practical work can be carried out, free from the distraction of workshop conditions, yet at the same time preserving the lay-out and atmosphere in which the trainees will ultimately be employed.

Machinery, hand tools, and equipment generally will depend on the trade being taught, but it is necessary that they be comparable in all respects with similar equipment and tools used in actual manufacturing processes.

Time Allocation

The time required for the various sections of instruction is given in the time table on pages 60 and 61, and by building on this unit time, some basis, depending on numbers involved, for the length of the course and the total time necessary for each section of the training can be calculated. This is a typical time-table for a class of 16 trainees that may need to be modified to suit the particular industry involved, or the times at which trainees can attend.

It should be stressed that a continuous session of training, contained within a comparatively short period, is preferable to part-time training spread out over a long period. In other words, it is better to release the workers for a full period of, say, three months, rather than that they should attend on half-days spread over a longer period. In this way greater continuity of teaching and learning is maintained, and the flow of trainees can be regulated to a more definite time-table.

It will be found that if the specimen time-table is adopted, two teachers can handle such a class of 16 trainees for practical and theoretical work, and ensure that each section of the work is adequately supervised, the necessary lectures and lessons given, and written work checked.

It will be noticed that the training week is one of 44 hours. This has been taken as an average working week in industry; as the trainee must accustom himself to normal works conditions as early as possible, it is advisable to make his training week comparable with industrial practice.

CHAPTER IX

RECORDS AND PLANNING

An integrated plan is essential for this scheme of vocational training, and a record for each trainee is a necessary part of it.

Records

If uniform results are to accrue, detailed records must be maintained by the staff. These should cover each entrant and contain at the outset particulars of each trainee: age, sex, particulars of educational training and qualifications, type of work for which engaged, date of entry into the firm, and notes of any personal characteristics, both mental and physical. This information is necessary and may often be referred to where individual problems of training arise. Starting from this basis, the records of the work done during the training course are collected at every stage.

It may be that the scheme calls for the training of workers in a particular operation, and that having achieved the standard of performance aimed at, the trainee is then returned to his original department.

On the other hand, the scheme may be required to give all-round training in a craft, and later on the worker will specialize in some branch of that craft. The last example would normally involve a longer course than the first, but whichever aspect is under review, the same principles apply: planned training carried out under close supervision and with adequate facilities as regards tools and materials.

The syllabus should be planned in progressive stages, and the trainee's progress recorded at least weekly. Close observation will usually discover the cause of lack of progress, and it then becomes necessary immediately to remove this cause in the case of that individual.

Unless a consistent record is maintained, the same difficulties will be continually arising, and no past evidence will be available in analysing the causes.

Records sometimes reveal strange variations in progress. It often happens that for no apparent reason a trainee's standard of performance falls. This lower level of performance may persist for some time, and then, for no apparent reason, suddenly improve. Non-progressive periods vary greatly from one individual to another. They may be the result of personal difficulties due to domestic trouble; health may be a contributing factor; sometimes boredom or unsuitable working conditions produce these apparently flat periods. Only by regular reference to the progress records can these troubles be aptly dealt with.

The trainees themselves will also maintain records of their work, which should come under regular supervision and checking. The practice of taking lecture notes should be encouraged. These, if subsequently recorded in a durably bound book, will not only be of assistance to the teacher in reviewing progress, but will later become a valuable reference book to the trainee. The teacher should be particularly careful in correcting such records. Any mis-statement or inaccurate drawing not corrected may at some future date be consulted by the trainee and wrong information derived therefrom.

Needless to say, records of attendance and punctuality should be maintained. It is as important to inculcate regular habits of conduct as to teach proper methods of work, and such records should be used to arrive at any recommendation or report that is made at the end of the training period.

Reports on the course taken will be required in order that the best use can be made of the trainee's acquired skill, and from the data accumulated by the teachers the superintendent will, in consultation with his staff, prepare these final reports. It may be that some well-defined standard of comparison is

possible in some trades. If this is so any report made should be compiled in relation to this standard. Such a standard may vary from time to time. In fact, it is reasonable to suggest that as the training scheme begins to bear fruit, the standard of performance throughout the undertaking will improve. If that is so the standard of comparison will naturally be raised, and after all, this is the object of the training scheme and should be encouraged.

On the other hand it may not be possible to define such a standard, and in that case it will be the responsibility of the superintendent to fix, not only in his own mind, but in the minds of his staff, some basis on which reports can be made. Whichever system is used it is important not only that the quality of the work should be assessed, but that some indication should be given of the personal characteristics of the worker. Some may be expert workers but slow. Others may be far more useful on individual work than on operations that require co-operation with one or more colleagues.

When the trainee has passed out into the workshop, such personal characteristics as loyalty, ability to carry responsibility, attention to detail, and attitude towards superiors are all matters that will influence a departmental head in allocating work, and, incidentally, will also influence consideration for promotion. They must be included in the trainee's record, and be regarded as matters in which the trainee should be given assistance when necessary.

Training Plan

A suggested time-table for a practical training course for workers, extending over sixteen weeks, is given on pages 60 and 61, and is intended as a general basis on which a course for most trades could be built. It will be appreciated that the time could be longer or shorter, depending on the occupation concerned, but the time devoted to each section of the

curriculum should follow approximately the percentages given in the table.

SUBJECT NOTES

The following notes explain the time-table, and also advance the considerations that have determined its build-up.

Sections of Work. There are three main divisions : practice, theory, and interest.

The first covers all practical work, including revision and tests, and takes up over three-quarters of the available time.

The second division embraces all lecture and lesson periods, including any necessary general educational work.

The third division, which has been called "Interest," and which will depend to some extent on the opportunities available, includes instructional visits, film shows, and periods of individual study.

Time Division. The course is divided into three parts : elementary, intermediate, and final. The periods concerned are somewhat flexible, depending on the trade and type of trainee under instruction. It is advisable, however, that the intermediate section of the work should form at least half of the period, and if any adjustments are necessary, they should tend to lengthen this time rather than reduce it. If the result of any such adjustment is to reduce the final section, this is covered to some extent by continued training referred to in the next chapter.

Practical Work. As the aim is to train manipulative workers, this section is of first importance. By means of carefully graded exercises leading up to real trade examples, carried out with the usual tools and equipment found in the trade, and with consideration for the economic time for the job, the trainee's skill is gradually improved.

Revision and Tests. It will be noted that one day per month is allocated for tests during the first three months, and that forty hours of the last month are devoted to passing-out tests. These monthly tests should be devised so as to reflect the

TRAINING PLAN AND TIME ALLOCATION

Weekly Time Division	Sections of Training Work	Elementary Weeks				Total Hours
		1	2	3	4	
Elementary 4 Weeks	PRACTICE					
	Practical Work	31	30	31	22	114
	Revision and Tests				8	8
Intermediate 8 weeks	THEORY					
	Educational Lectures	5	5	5	5	20
	Background Lectures	1	1	1	1	4
	Trade Lectures	2	2	2	2	8
	Trade Lessons	3	3	3	3	12
Final 4 weeks	INTEREST					
	Instructional Visits	–	–	–	–	–
	Film Exhibitions	–	1	–	1	2
	Study Periods	2	2	2	2	8
						176

FOR A WORKER'S COURSE OF 16 WEEKS.

Intermediate Weeks								Total Hours	Final Weeks				Total Hours	Section Total Hours	Section Grand Totals
5	6	7	8	9	10	11	12		13	14	15	16			
36	35	36	27	37	28	37	28	264	37	28	37		102	480	77% or
			8				8	16				40	40	64	544 hours
–	–	–	–	–	–	–	–	–	–	–	–	–	–	20	15% or
1	1	1	1	–	–	–	–	4	–	–	–	–	–	8	105 hours
2	2	2	2	2	2	2	2	16	2	2	2	2	8	32	
3	3	3	3	3	3	3	3	24	3	3	3	–	9	45	
–	–	–	–	–	8	–	–	8	–	8	–	–	8	16	8% or
–	1	–	1	–	1	–	1	4	–	1	–	–	1	7	55 hours
2	2	2	2	2	2	2	2	16	2	2	2	2	8	32	
								352					176	704	**704 hours**

training preceding the test, and must be the trainee's unaided work. After results have been assessed by the teacher, examples that fail to reach the required standard should be reviewed with the trainee concerned.

The final test that takes place during the last week of the course is more comprehensive and should be designed to incorporate as many as possible of the operations and skills taught, therefore a longer period (40 hours) is allowed.

Educational Lectures. These are intended to refresh the trainee's general educational background and to determine whether his standard is sufficiently high for the course to be taken. Emphasis on particular subjects will vary with the trade to be taught, but for most crafts arithmetic, drawing, and some English will be found indispensable. Twenty hours spread over the first four weeks are devoted to these lectures, but individual cases—and some occupations—may require more. Whatever the nature of the course, this question of general educational suitability must be decided, either before the course or early in it. If the matter is decided before, the time allocated in the plan can very usefully be used in revision and refreshing any special subjects required for a particular trade.

Background Lectures. These weekly talks, spread over the early part of the course, are designed to give the trainee a general acquaintance with matters that, although not strictly within his training, are related to it. They will include methods of organization, sources of materials, history and development of the firm concerned, history of the craft concerned, and similar quasi-technical matters that build up an interest in the training to be undertaken.

Trade Lectures. Two separate hourly periods each week are devoted to talks—illustrated with blackboard sketches, models, or charts as appropriate—on trade processes, methods of construction, and tools used in the training. As described earlier, these talks will deal with matters of a technical nature that require some time for a complete exposition, and cannot

readily be dealt with by trade lessons or given by way of explanation during a practical demonstration. They should be arranged to keep in step with and amplify the practical work, and prepare the trainee for this work.

Trade Lessons. For thirty minutes each day the teacher will break off practical work and talk on some simple subject directly connected with the training in progress. These talks can take place in the working area and will deal with tool manipulation, processes involved, materials, and be supported or illustrated by models or sketches. Each should be complete in itself and, if they are wisely used, will emphasize some current aspect of the practical work in progress at the time. A section of Chapter V deals more fully with this aspect.

Instructional Visits. Two full days are allocated for visits to factories, exhibitions, sites, or any department within the firm where work is proceeding that is connected with the subjects being taught. These visits should be of an interesting educational nature and the time allocated may profitably be extended if suitable opportunities arise. Trainees should keep records of these visits, and reference to them can be made, as appropriate, by the teacher in his trade lectures.

Film Exhibitions. One hour in alternate weeks, excluding the last week, is allowed for the showing of educational or trade interest films. The reader is referred to Chapter VI for guidance on the use of films. No hesitation should arise in curtailing the use of films if the right type is not available. Their teaching value, not their entertainment value, should determine their usefulness.

Study Periods. It is considered essential that some definite allocation of time should be made for the trainee's own use. This is not a substitute for study outside training hours, but allows the teacher to guide the preparation and recording of work on a class basis. Trainees should be allowed to use these periods for any form of study or writing-up of notes, and seek guidance from the teacher as required. Two hours each week are allowed for this purpose.

CHAPTER X

APPLYING THE PLAN

The final criterion of the success or failure of the training given will be the ease and effectiveness of the absorption into ordinary industrial work of the workers so trained. This transition from training to industrial work brings many of its own peculiar problems.

Application

It should not be expected that newly trained people will immediately take over the ordinary operative work without some supervision. It is best, therefore, to consider the earlier periods, at least, of the man's entry into industry as being continued training. A successful method is to place these people under the personal supervision of experienced operatives, who will be responsible for guiding them, not only regarding workshop customs and routine, but also from the point of view of the skill required for the job. These supervising workmen should be taken fully into the confidence of the foreman and be encouraged to realize that for the new entrants this period is crucial and may make or mar the results of the training course proper.

If a number of new entrants are to be engaged in the same department, it is better that they be spread out as much as possible and not placed so that they are working together and all under the supervision of one person. Two entrants are considered the maximum for which any experienced operative can be asked to accept responsibility, and it will be found that if this operative is approached in the right way, and given to understand that he is contributing to the success, not only of the firm, but of his own department, the correct reaction from both the new entrants and the more experienced operatives will be fostered.

Follow-up

The results of this extended training will be important in so far as they must decide the success or otherwise of the planned training scheme. Some of this success will depend on the records and reports obtained, and some on the personality and interest of the supervising operative. He should be required to report periodically on the progress being made by the new entrant. These reports must be the supervising operative's own frank opinion from a purely working efficiency point of view. At the same time, he should record facts first and give his opinions after. Whilst he may, from his experience and observation, be able to form a considered opinion, he may not be competent to make a statement of fact.

Suppose, for instance, that in performing a certain manual operation, the learner is slow and jerky in his movements. The supervisor might wish to record this, and report that the worker had rheumatism in his arms which made his movements slow and uneven. This may of course be wrong. He should report the facts first, namely that the learner's arm movements were slow and uneven and that in his (the supervisor's) opinion this might be due to a mild form of rheumatism.

The above is given as an outstanding example that did occur in practice and is admittedly an extreme case. In many instances the matter is not so clear-cut, and to avoid confusion a simple form of questionnaire, which the supervisor can fill in, is a sound method to adopt.

The information required will decide the form this questionnaire should take, but below a suggested plan is outlined that can be amplified to suit any particular organization.

CONTINUED TRAINING

Name....................Clock No.........Department ....

Work on which engaged..

1. Time-keeping and discipline.
2. Attitude towards superiors.

3. Does the worker appear anxious to learn ?
4. Is he/she contented and industrious ?
5. Is the quality of work improving ?
6. Is the quantity of work improving ?
7. Does he/she " get on " with other workers ?
8. Is he/she likely to become fully proficient ?
   (If the answer is " No " give brief reasons.)
9. General remarks.

No. of weeks in continued training.......... Date.............

Signature of Supervisory Worker...............................

Signature of Departmental Head................................

It may be that the personal relationships between the super-visor and the new entrant are not entirely satisfactory, and reports on progress coloured thereby. It is, therefore, important to ensure that the supervising workman is not prejudiced in any way, either against the scheme as a whole, or against the new entrant under his supervision. If there is no general difficulty, and the difficulty is applicable only to the two persons concerned, the remedy is obvious. The new entrant should be placed under some other supervising operative. Only the superintendent of training and the head of the department concerned can decide this point, but it is important that every effort should be made to obtain the necessary adjustments.

The superintendent of training should also arrange to meet the new entrants at intervals in order to adjust any personal difficulties, and generally to form an estimate of the manner in which the new worker is fitting himself into the general scheme.

Assessing Results

It is as important to assess and record the results of this continued training as it was during the training course proper. A continuous report and progress record should be called for and this will form a valuable guide to the superintendent when interviewing the worker. It is necessary to have these records not only of work and progress within the firm, but also of an

outside activities, e.g., of attendance at evening classes, and the results obtained. Any other activities, particularly of a cultural nature, such as those connected with community work and youth movements, are all helpful in building up a complete picture of interest in and approach to life in general.

There may be a tendency to assess the results of training more from the quantity of work done than from its quality. Whilst trained workers may rightly be expected to increase production, this should not prejudice the standard of work required. Training implies a long-term view with little emphasis on the importance of immediate results. If the suggestions made earlier in this book are consistently applied, a trained labour force will be built up from which results cannot be expected immediately but which will inevitably produce results in the future. As the new entrants become more and more absorbed into the routine departmental activities, and thereby become accustomed and skilled in their own particular operations, evidence of further ability may become apparent.

The superintendent will, therefore, always be on the alert to recognize evidence of potential leadership. It should be his aim to encourage the people who have passed through the training scheme. It may well be that some arrangements could be made whereby separate training to develop these potentialities of leadership could be given, but it is not proposed to deal with that side of training here. Nevertheless, if the scheme as outlined is applied, and results assessed and followed up, experience has shown that quite a considerable proportion of the trainees will show outstanding merit, and this, of course, should be encouraged to the utmost.

Conclusion

The whole object of this manual has been to correlate a number of well-tried methods of teaching and training. Certain theories have been advanced, but they have all been subjected to practical tests. Only the bare fundamentals have

been dealt with, and the author realizes that there is a gr deal more that could be written by way of amplification the methods suggested, and the exploration of additio methods. However, if what has been said encourages planned effort on the part of teachers and employers to ap these well-tried fundamental principles, the book will ha fulfilled its original purpose.

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